III. Population, Land Use, and Traffic

In order to fulfill the objectives of an adequate long range transportation plan, reliable forecasts of future travel patterns must be achieved. Such forecasts depend on careful analysis of the following items: historic and potential population changes, significant economic trends, character and intensity of land development, and the ability of the existing transportation system to meet existing and future travel demand. Secondary items that influence forecasts include the effects of legal controls such as zoning ordinances and subdivision regulations, availability of public utilities and transportation facilities, and topographic and other physical features of the urban area.

Population

Since the volume of traffic on a roadway is related to the size and distribution of the population that it serves, population data is used to aid the development of the transportation plan. Future population estimates typically rely on the observance of past population trends and counts. While statistics show that the population within the planning area has been increasing at a steady rate, the City has suggested that the population will have a significant increase in the next ten to fifteen years. The Stanly County population will be growing at a slower rate than the planning area, but the southwestern part of the county should see an increase in population. According to the City, the population will triple in the next ten years if everything that is proposed is built. **Table 1** presents the population trends for Locust, Stanfield, Stanly County, Cabarrus County, and North Carolina.

Table 1 Population Growth

Location	1970	1980	1990	2000	2030
North Carolina	5,082,059	5,881,766	6,628,637	8,046,485	12,447,597
Cabarrus County	74,629	85,895	98,935	131,063	246,640
Stanly County	42,822	48,517	51,765	58,100	76,649
Locust	1,484	1,590	1,940	2,416	13,000
Stanfield	458	463	517	1,113	2,500

Population growth in an urban area is typically 1-3% annually. Historic trends for Locust yielded a 2% growth rate. After discussions with the area, an 8% growth rate was used for the first 20 years of the planning area and a 2% growth rate was used for the remaining years. Historic trends for Stanfield yielded a 6% growth rate that is unsustainable and a 2% growth rate was used instead of the original 6%. Based on these projected growth rates, it was determined that Locust will have a population of 13,000 and Stanfield will have a population of 2,500 in 2030.

Land Use

Land use refers to the physical patterns of activities and functions within an area. The transportation demand along a particular road or for multi-modal facilities is related to the land uses adjacent to that facility and the intensity of land use effects the traffic patterns for multi-modal facilities. For example, a shopping center generates larger traffic volumes than a residential area. The spatial distribution of varying land uses is the predominant determinant of when, where, and why congestion occurs. The attraction between different land uses and their association with travel varies with the size, type, intensity, and spatial separation of each land use. When dealing with transportation planning, land use is divided into the following classifications:

- Residential – All land is devoted to the housing of people, with the exception of hotels and motels.

- Commercial – All land is devoted to retail trade including consumer and business services and their offices; this may be further stratified into retail and special retail classifications. Special retail would include high-traffic establishments, such as fast-food restaurants and service stations; all other commercial establishments would be considered retail.

- Industrial – All land is devoted to the manufacturing, storage, warehousing, and transportation of products.

- Public – All land is devoted to social, religious, educational, cultural, and political activities; this would include the office and service employment establishments.

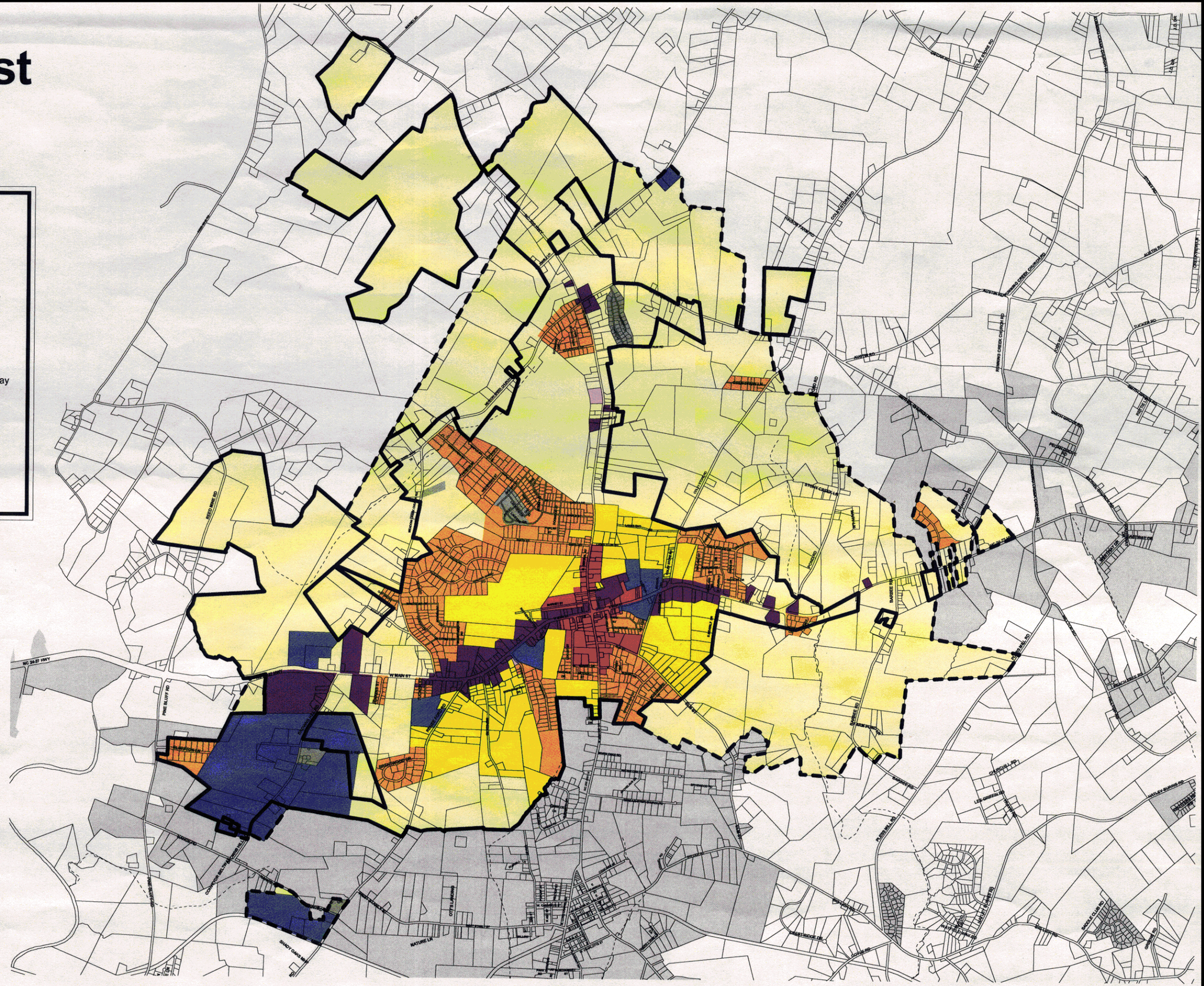
Figure 5 shows the existing zoning for the City of Locust and **Figure 6** shows the existing zoning for the Town of Stanfield. **Figure 7** shows the 1993 land use plan for the Town of Stanfield. The anticipated land use development for the planning area is predominantly residential, industrial, and commercial. Noticeable residential growth is expected in the planning area with the highest growth in the southern and northern portion of the planning area. The areas of highest employment growth are expected along the major roadway corridors throughout the planning area (NC 200, NC 24-27, and Browns Hill Road). Controlling development along the NC 200 corridor will help prepare the corridor for the planning area's vision of a boulevard. Promoting high-density, multi-land use in the planning area will in turn promote a multi-modal transportation system due to ease of access to the alternative modes of transportation.

City of Locust

Zoning Map

Zoning Districts

- OPS Open Space District
- NR Neighborhood Residential
- GR General Residential
- CC City Center
- LHC Light Highway Commercial
- HC Highway Commercial
- CBI Campus Business and Institutional
- MH Mobile Home District
- TND-O Traditional Neighborhood Development Overlay
- Locust Municipal Limits
- Locust ETJ Boundary
- Other Municipalities
- Parcels
- Streams



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Scale: 1 inch = 2800 feet

FIGURE 5

Prepared by Centralina Council of Governments, August 8, 2003.

FIGURE 6

Zoning Districts

Legend

- Zoning Districts
- C-B: Central Business
- CBI: Central Business Industrial
- G-B: General Business
- I: Industrial
- OPS: Open Space
- R-12: Residential
- R-20: Residential
- R-A: Residential - Agricultural
- Roads

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Town of Stanfield, NC

Generalized Future Land Use Map, 1993

FIGURE 7

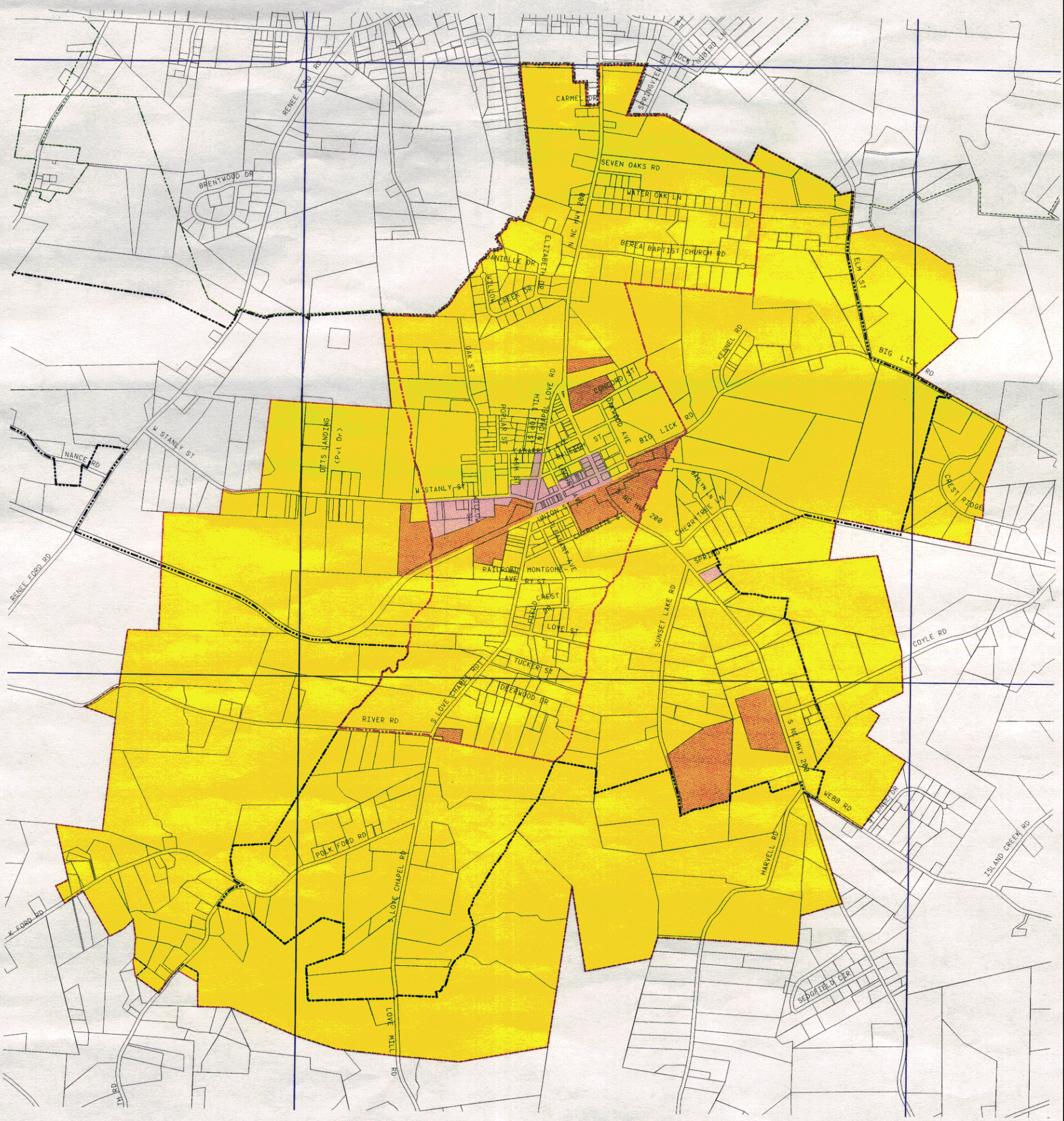
Future Land Use

- Residential
- Retail
- Industrial

- Street ROWs and Lot Boundaries
- 1993 Stanfield Corporate Limits
- 1993 ETJ Boundary
- 1999 Stanfield Corporate Limits
- 1999 ETJ Boundary

- Locust Town Limits
- Locust ETJ Boundary

- County Index Boundaries



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Existing Roadway System

An important stage in the development of a comprehensive transportation plan is the analysis of the existing roadway system and its ability to serve the area's travel desires. Emphasis is placed not only on detecting the existing deficiencies, but also on understanding the causes of these deficiencies. Travel deficiencies may be localized, resulting from problems with inadequate pavement width, intersection geometry, or intersection controls. Travel deficiencies may also result from system problems such as the need to construct missing travel links, bypass routes, loop facilities, or additional radial routes.

An analysis of the roadway system looks at both current and future travel patterns and identifies existing and anticipated deficiencies. This is usually accomplished through a traffic collision analysis, roadway capacity deficiency analysis, and a system deficiency analysis. This information is used to analyze factors that will impact the future system including population growth, economic development potential, and land use trends.

Traffic Crash Analysis

Traffic crashes are often used as an indicator for locating congestion problems. While often the result of drivers or vehicle performance, crashes may also be a result of the physical characteristics of the roadway. Roadway conditions and obstructions, traffic conditions, and weather may all lead to a crash. While some crashes are the fault of the driver, others may be prevented with physical design or traffic control changes such as the installation of stop signs or traffic signals.

Crash data for the period from January 1999 to December 2001 was studied as part of the development of the plan. The crash analysis considered both crash frequency and severity. Crash frequency is the total number of reported collisions while crash severity is the crash rate based upon injuries and property damage incurred. These two factors helped to determine the worst intersections within the planning area that are summarized in **Table 2** and shown in **Figure 8**.

The NCDOT is actively involved with investigating and improving many of these locations. To request a more detailed analysis for any of the locations listed in **Table 2**, or other intersections of concern, the planning area should contact the Division Traffic Engineer. Contact information for the Division Traffic Engineer is included in **Appendix A**.

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FIGURE 8
CRASH LOCATIONS

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LEGEND

- STUDY AREA
- MUNICIPAL BOUNDARIES
- HIGH CRASH LOCATIONS

Table 2 Crash Locations			
Map Index	**Intersection**	**Average Severity**	**Total Collisions**
1	NC 24 at Meadow Creek Church Rd (SR 1200)		6
2	NC 24 at Renee Ford Rd (SR 1140)		16
3	Bell St at Main St		12
4	NC 24 at Bell St		4
5	NC 24 at Locust Ave		8
6	NC 24 at NC 200		15
7	NC 200 at Elm St (SR 1137)		4
8	Bethel Church Rd (SR 1200) at Coley Store Rd (SR 1211)	34	5
9	Running Creek Rd (SR 1134) at Bethel Church Rd (SR 1200)	77	1

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Roadway Capacity Deficiencies

Roadway capacity deficiencies occur wherever the travel demand volume of a roadway is close to or more than the capacity of that roadway. Travel demand volume is the total number of vehicles that wish to use a roadway on a daily basis. The existing travel demand volumes for the planning area are based upon traffic count data taken annually by the NCDOT Traffic Survey Unit and are shown in **Figure 9** for the year 2002. The projected 2030 travel demand volumes, which are based upon historic and anticipated population, economic growth patterns, and land use trends, are shown in **Figure 10**.

Capacity is the maximum number of vehicles that can pass over a given section of roadway during a given time period under prevailing roadway and traffic conditions while still maintaining a service level that is acceptable to drivers. Many factors contribute to the capacity of a roadway including:

- Geometry of the road, including number of lanes, horizontal and vertical alignment, and proximity of perceived obstructions to safe travel along the road;
- Typical users of the road, such as commuters, recreational travelers, and truck traffic;
- Access control, including streets and driveways, or lack thereof, along the roadway;
- Development of the road, including residential, commercial, and industrial developments;
- Number of traffic signals along the route;
- Peaking characteristics of the traffic on the road;
- Characteristics of side-roads feeding into the road; and
- Directional split of traffic or the percentages of vehicles traveling in each direction along a road at any given time.

2002 Traffic Capacity Analysis

The comparison of the 2002 travel demand volumes for the major roadways in the planning area to the current practical capacities for these roadways did not identify any deficiencies in the planning area.

2030 Traffic Capacity Analysis

The capacity deficiency analysis for the 2030 design year examined the existing street system and determined that NC 200 will be the only road that will exceed practical capacity within the planning area by the design year.

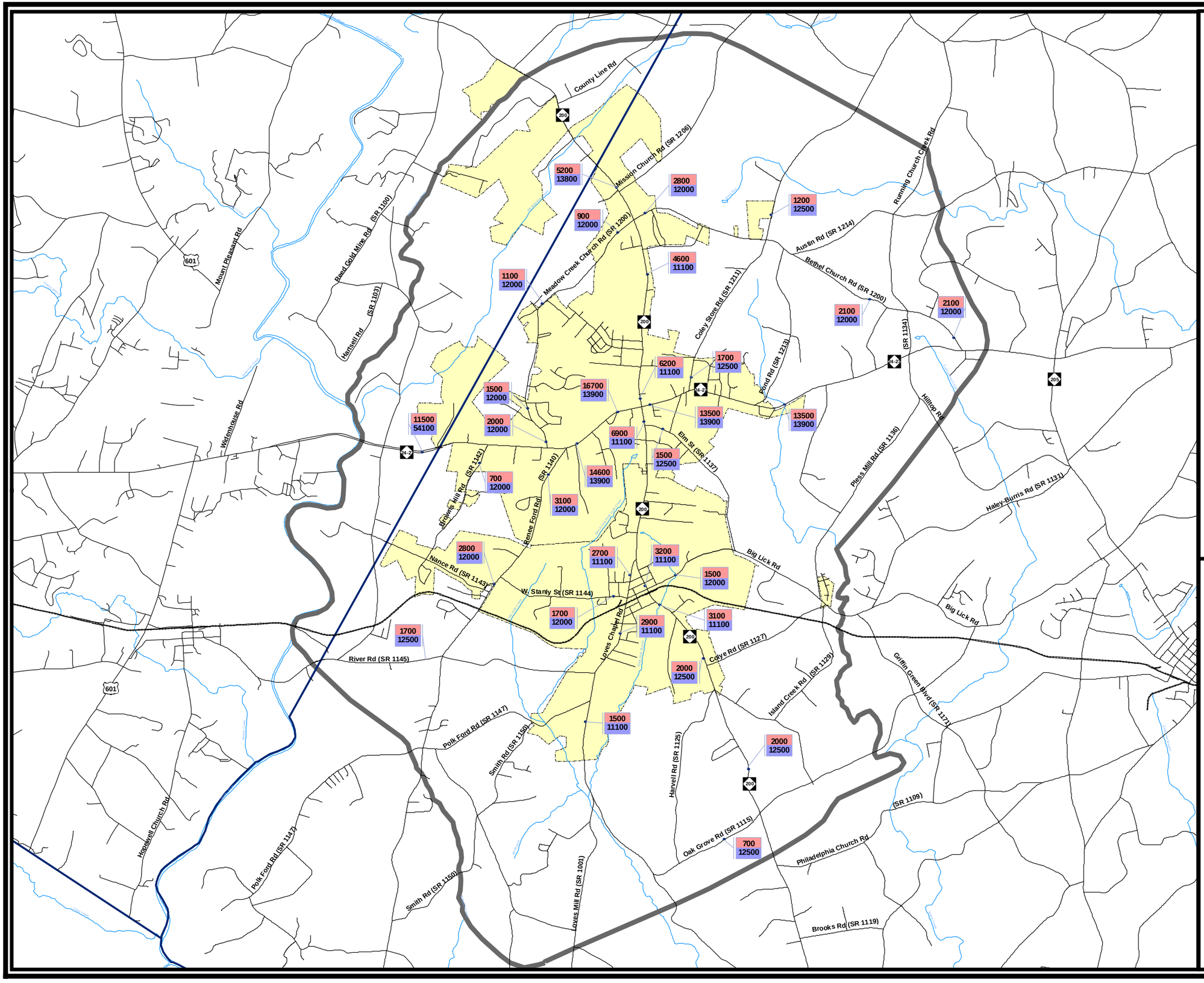

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FIGURE 9

2002 AADT COUNTS

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LEGEND

- STUDY AREA
- MUNICIPAL BOUNDARIES
- EXISTING VOLUMES
- CAPACITY

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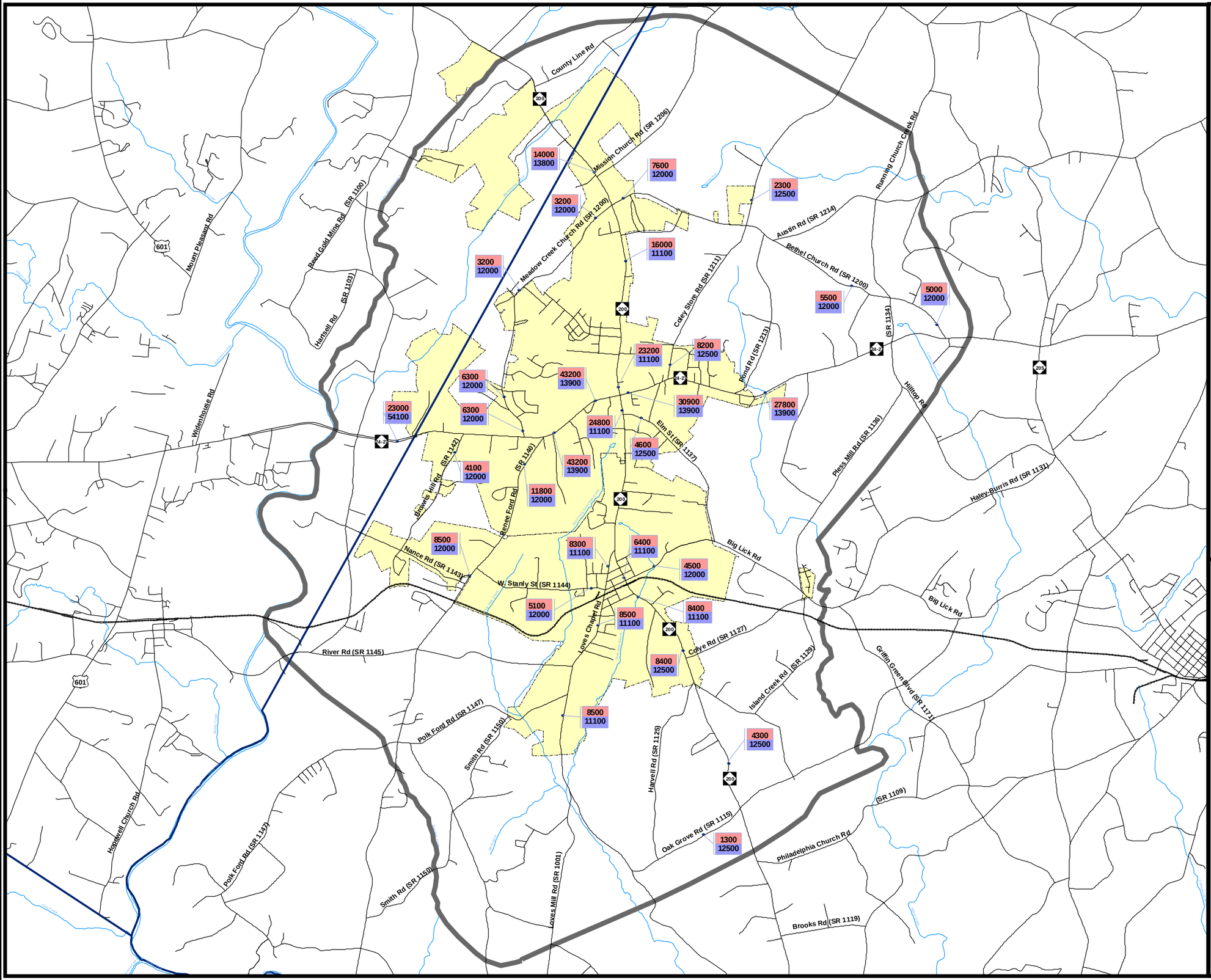
FIGURE 10

2030 AADT COUNTS



LEGEND

- STUDY AREA
- MUNICIPAL BOUNDARIES
- PROJECTED VOLUMES
- CAPACITY

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Bridge Conditions

Bridges are an important element of a highway system. Any bridge deficiency will affect the efficiency of the entire transportation system. In addition, bridges present the greatest opportunity of all potential highway failures for disruption of community welfare and loss of life. Therefore, bridges must be constructed to the same, or higher, design standards as the system of which they are a part and must be inspected regularly to ensure the safety of the traveling public. Every effort should be made when replacing bridges as to not create a barrier for pedestrians and bicyclists. Coordination for bridge replacements should include the Division of Bicycle and Pedestrian Transportation.

The NCDOT Bridge Maintenance Unit inspects all bridges in North Carolina at least once every two years. A sufficiency rating for each bridge is calculated and establishes the eligibility and priority for replacement. Bridges having the highest priority are replaced as Federal and State funds become available.

A bridge is considered deficient if it is either Structurally Deficient or Functionally Obsolete. A bridge at least ten years old is considered structurally deficient if it is in relatively poor condition or has insufficient load-carry capacity, due to either the original design or to deterioration. The bridge is considered to be functionally obsolete if it is narrow, has inadequate under-clearances, has insufficient load-carrying capacity, is poorly aligned with the roadway, and can no longer adequately serve existing traffic. A bridge must be classified as deficient in order to qualify for Federal replacement funds. In addition, the bridge must have a certain sufficiency rating to qualify for these funds. To qualify for replacement, the sufficiency rating must be less than 50%; for rehabilitation, the sufficiency rating must be less than 80%. Deficient bridges within the planning area are given in **Table 3** with the location of these bridges shown in **Figure 11**.

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FIGURE 11

DEFICIENT BRIDGES

LEGEND

- STUDY AREA
- MUNICIPAL BOUNDARIES
- DEFICIENT BRIDGES

Table 3. Structurally Deficient & Functionally Obsolete Bridges Located within the Planning Area

Identify Number	Bridge Number	Location	Sufficiency Rating	Year Built	Remaining Life
1	125	On Big Lick Road (SR 1130) over creek	55.7	1951	19 years
2	134	On Renee Ford Road (SR 1140) over railroad	68.9	1936	19 years
3	135 ~	On Polk Ford Road (SR 1147) over creek	40.4	1959	10 years
4	209 ~	On Pless Mill Road (SR 1136) over creek	29	1959	15 years
5	138	On Reed Mine Road (SR 1100) over creek	70.3	1959	36 years
6	22	On NC 24-27 over creek	56.1	1923	26 years

~ Found in 2004 - 2010 TIP

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